

## Norfolk County – Asset Management Plan – Water and Wastewater Treatment Facilities

An overview of the County's Asset Management Practices based on the Ontario Ministry of Infrastructure's Building Together Initiative



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## Sign-off Sheet

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# NORFOLK COUNTY – ASSET MANAGEMENT PLAN – WATER AND WASTEWATER TREATMENT FACILITIES

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## **Executive Summary**

Municipalities are stewards of Community infrastructure. Well-managed infrastructure fosters prosperity, growth, and quality of life for a Community's residents, businesses, and visitors.

Most Canadian municipalities are struggling to maintain existing infrastructure under current tax and rate levels. They continue to deal with downloaded responsibilities and, at the same time, face growing needs to maintain and renew aged and decaying infrastructure.

The subject of asset management has been gaining increasing public awareness as a result of the introduction of Bill 175, the Sustainable Water and Sewage Systems Act in 2002, and the implementation of "Full Cost Accounting" through the Public Sector Accounting Board (PSAB). The emphasis is now being placed on not only knowing the true cost of providing services to your customers today, but also understanding what will be required to maintain the services virtually in perpetuity (or as long as they are required), through the use of life cycle costing. In other words, we are moving towards Sustainable Asset Management.

Ontario's Ministry of Infrastructure has also recently released guidelines for the development of Municipal Asset Management Plans, which supports the Province's 10-year infrastructure plan "Building Together". The objective of these guidelines is to provide a basis for the standardization and consistency of asset management practices across Ontario's municipalities.

This document follows the Ministry's guidelines for the development of an Asset Management Plan for the water and wastewater treatment facilities.





# NORFOLK COUNTY – ASSET MANAGEMENT PLAN – WATER AND WASTEWATER TREATMENT FACILITIES

## 1.0 Introduction

### 1.1 GOALS AND OBJECTIVES

This Asset Management Plan has been prepared in response to the Ontario Ministry of Infrastructure's *Building Together* initiative, and provides the County with a medium-term business plan for ensuring long-term sustainability of the County's infrastructure.

#### 1.1.1 Scope of Work

The scope and format of this document follows the Ministry of Infrastructure's *Building Together: Guide for Municipal Asset Management Plans*. The Guide outlines the specific elements of a detailed asset management plan, which includes:

1. Summary
2. Introduction
3. State of Local Infrastructure
4. Desired Levels of Service
5. Asset Management Strategy
6. Financing Strategy

The County has developed individual Asset Management Plans following the Ministry's guidelines and suggested format for roads, bridges, and water and wastewater systems. The County is not responsible for social housing, an asset group to be included, if applicable, as per the Ministry's guide.

This document focuses on the County's Water and Wastewater treatment infrastructure.



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## 2.0 State of Local Infrastructure

A State of the Infrastructure report provides the County with an understanding of the true cost of maintaining the infrastructure that is required to provide the services to the Community. The following State of the Infrastructure (SotI) assessment was developed through a Life Cycle Analysis, covering the County’s water and wastewater treatment facilities.

Due to the limited availability of data on the condition of the treatment facilities this SotI was based on a high-level analysis of the replacement, rehabilitation, and maintenance needs of these assets. The following treatment facilities were included in the study.

**Table 2.1: Treatment Facilities**

Water	Cedar St, Simcoe
	Union St, Simcoe
	14th St W, Simcoe
	Nelson St, Port Dover
	William St, Port Dover
	Argyle Ave, Delhi
	Windham Ave, Delhi
	Archibald Dr, Port Rowan
	Sovereign St, Waterford
	Mechanic St, Waterford
	Thompson Rd, Waterford
	Highway 3, Courtland
	Wastewater
Port Dover	
Delhi	
Waterford	
Port Rowan	

In November 2003, the National Guide for Sustainable Municipal Infrastructure published a Best Practices for Municipal Infrastructure Asset Management. This publication included a listing of seven questions, which could be used as a framework for an asset management plan. The SotIR employs this framework:

1. What do you have and where is it?  
(Inventory)
2. What is it worth?  
(Costs/Replacement Rates)
3. What is its condition and expected remaining service life?  
(Condition and Capability Analysis)
4. What is the level of service expectation, and what needs to be done?  
(Capital and Operating Plans)

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5. When do you need to do it?  
(Capital and Operating Plans)
6. How much will it cost and what is the acceptable level of risk(s)?  
(Short- and Long-term Financial Plan)
7. How do you ensure long-term affordability?  
(Short- and Long-term Financial Plan)

The County's Public Works assets have a replacement value of **\$2.2 billion**. The breakdown of those replacement values per serviced property, based on approximately 15,000 serviced properties/households in the County, are shown in Figure 2.1.

It can be noted that the sanitary sewer networks account for approximately **5.7%** or **\$125.0 million**, of the total asset replacement value for the County's infrastructure.

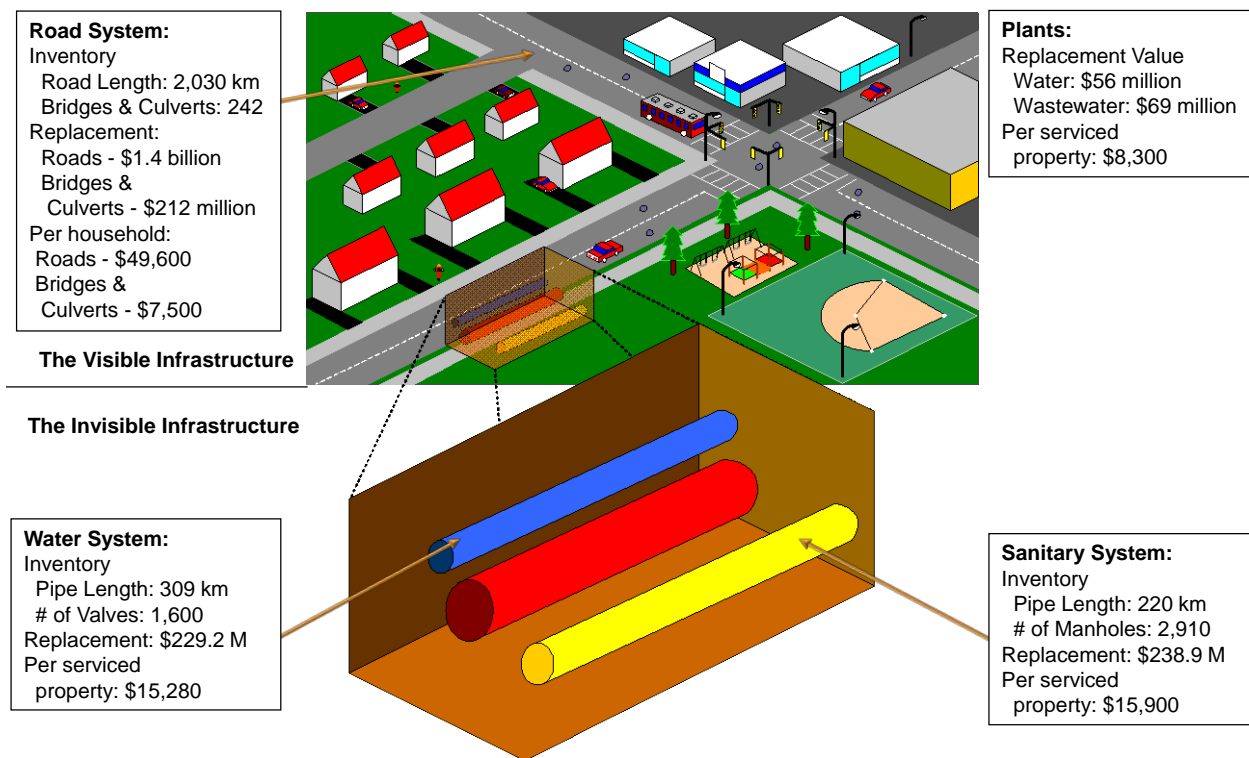


Figure 2.1: Asset Replacement Value per Serviced Property

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## 2.1 TREATMENT FACILITIES

The County’s water supply consists of five drinking-water systems including:

- Surface water facilities in Port Dover and Port Rowan
- Ground water facilities in Simcoe and Waterford
- One combination surface and ground water system in Delhi

Detailed overviews of these facilities can be found in the County’s Drinking Water Quality Management System Operational Plans ([http://www.norfolkcounty.ca/download/OP-2013-\(Public%20Copy\).pdf](http://www.norfolkcounty.ca/download/OP-2013-(Public%20Copy).pdf)).

The County’s “Water and Wastewater Master Plan”, 2007 (<https://norfolk.civicweb.net/content/pdfstorage/AA43BD62E18C4463A7127DDDF0FC34F9-Water%20and%20Wasterwater%20Master%20Plan%20-%20Summ.pdf>) describes the wastewater treatment facilities as follows:

*“Existing treatment technologies for the municipal systems within Norfolk County all satisfy the intent of procedure MOE F-5-1, and provide equivalent to secondary treatment. Wastewater treatment approaches consist generally of activated sludge treatment (Pt. Dover, Simcoe and Delhi) and a combination of aerated and facultative lagoons (Pt. Rowan and Waterford).*

*The existing treatment technologies employed within the County have a wide application, are proven to produce consistently good effluent quality”*

These treatment facilities consist of a group of components, including building structures, pipes, valves, pumps, and SCADA systems, which are summarized within Table 2.2.

**Table 2.2: Water and Wastewater Facility Asset Components**

Asset Component	What’s Included	
<b>Sanitary System</b>	<ul style="list-style-type: none"> <li>• Excavation and concrete</li> <li>• Structural Steel</li> <li>• Tanks</li> </ul>	<ul style="list-style-type: none"> <li>• Tunnels (Walkway passages)</li> <li>• Structural Walls</li> </ul>
<b>Building Shell &amp; Interior</b>	<ul style="list-style-type: none"> <li>• Doors</li> <li>• Roof</li> <li>• Windows</li> <li>• Floor</li> <li>• Interior Walls</li> <li>• Brick, exterior wall finishes (siding, aluminum, etc.)</li> </ul>	<ul style="list-style-type: none"> <li>• Lights</li> <li>• Ceiling</li> <li>• Non-structural steel</li> <li>• Masonry walls</li> <li>• Sheds</li> <li>• Health &amp; Safety (ladders, railings, etc.)</li> </ul>
<b>Building Services &amp; Equipment</b>	<ul style="list-style-type: none"> <li>• HVAC</li> <li>• Plumbing Potable</li> <li>• Plumbing Waste</li> <li>• Electrical services/lighting</li> </ul>	<ul style="list-style-type: none"> <li>• Sprinklers - fire protection</li> <li>• Health and safety (fire protection, eye wash stations, etc.)</li> <li>• Yard service piping (water mains/sanitary/storm sewers)</li> </ul>

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Asset Component	What's Included	
<b>Siteworks</b>	<ul style="list-style-type: none"> <li>• Other utilities (gas, etc.)</li> <li>• Roads (including related excavation)</li> <li>• Parking lots</li> </ul>	<ul style="list-style-type: none"> <li>• Sidewalks</li> <li>• Grading/landscaping</li> <li>• Health and safety (railings, steps, wheelchair ramps, etc.)</li> </ul>
<b>Piping</b>	<ul style="list-style-type: none"> <li>• Piping for all processes</li> <li>• Inside Piping</li> <li>• Outside Piping</li> </ul>	<ul style="list-style-type: none"> <li>• Specialty Piping</li> <li>• Chemical Piping</li> <li>• Intakes/outfalls</li> </ul>
<b>Mechanical</b>	<ul style="list-style-type: none"> <li>• Ozone</li> <li>• Conveyor</li> <li>• Automatic Transfer Switches</li> <li>• Cranes</li> <li>• Pumps</li> <li>• Filters</li> <li>• Screens</li> </ul>	<ul style="list-style-type: none"> <li>• Mixers</li> <li>• Gates</li> <li>• Valves</li> <li>• Disinfection equipment</li> <li>• Flights and chains</li> <li>• Motors</li> <li>• Diesel Generators</li> <li>• Actuators</li> </ul>
<b>Electrical</b>	<ul style="list-style-type: none"> <li>• Starters</li> <li>• Stand-alone motors</li> </ul>	<ul style="list-style-type: none"> <li>• MCCs</li> <li>• VFDs</li> </ul>
<b>Instrumentation &amp; SCADA</b>	<ul style="list-style-type: none"> <li>• Switches</li> <li>• Monitors</li> <li>• Detectors</li> </ul>	<ul style="list-style-type: none"> <li>• Health &amp; Safety (Fire/gas alarms, etc.)</li> </ul>

## 2.1.1 Valuations

Table 2.4 outlines the assumptions made on asset valuation.

### 2.1.1.1 Financial Accounting Valuation

Based upon the County's 2012 Financial Information Return filed with the Ministry of Municipal Affairs, the Net Book Value of the County's water and wastewater treatment facilities at the end of 2012 was **\$41.7** million. The assets included in this figure are outlined in Table 2.3 below.

**Table 2.3: FIR Schedule of Tangible Capital Assets (Schedule 51)**

Program	Asset Component	2012 Closing Net Book Value (million)
<b>Environmental Services</b>	Water treatment	\$13.9
	Wastewater treatment	\$27.8

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## 2.1.1.2 Replacement Cost Valuation

The estimated current replacement value of the treatment facilities and associated assets is **\$125 million**. Table 2.4 provides a breakdown of the contribution of each of the network components to the overall system value.

If this total asset value is translated to provide an average value for each of the approximately 15,000 serviced properties, then an average serviced property will be responsible for approximately **\$8,300** for Treatment Facility assets.

**Table 2.4: Water & Wastewater Facilities Replacement Value**

	Facility	Replacement Value <sup>1</sup>
Water	Cedar St, Simcoe	\$5,312,300
	Union St, Simcoe	\$2,802,900
	14th St W, Simcoe	\$6,527,000
	Nelson St, Port Dover	\$11,261,200
	William St, Port Dover	\$5,917,600
	Argyle Ave, Delhi	\$2,662,600
	Windham Rd 14, Delhi	\$2,952,300
	Archibald Dr, Port Rowan	\$6,742,900
	Sovereign St, Waterford	\$2,047,100
	Mechanic St, Waterford	\$1,652,100
	Thompson Rd, Waterford	\$4,882,500
	Highway 3, Courtland	\$3,254,500
	Wastewater	Simcoe
Port Dover		\$16,889,600
Delhi		\$12,160,400
Waterford		\$337,700
Port Rowan		\$8,392,600
<b>Total</b>		<b>\$124,871,900</b>

<sup>1</sup> Replacement values were obtained from the document "Estimate of Values, Buildings & Structures" dated 29/10/2012 (wastewater) and 31/10/2013 (water)

## 2.1.2 Age and Remaining Service Life

A useful life span can be assigned to the various components within the treatment facilities, such as those shown in Table 2.5. However, there are many conditions that can affect the true life of an asset, such as: design, construction, and manufacture quality, maintenance standards, quantity of use, surrounding environment, construction material, and so forth. Due to the limited availability of asset data, the following high-level assumptions were made for each of the facilities:

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**Table 2.5: Facility Assets Useful Life**

Asset Component	Proportion of Replacement Value (%)	Typical Useful Life (years)
Structures	75%	70
Mechanical & Electrical	25%	25

While these numbers represent a high-level assessment of the components of the treatment facilities they do, however, serve a purpose in planning financial investment requirements on a life cycle basis, as part of this assessment.

The level of intervention on infrastructure will vary significantly over the life cycle of an asset. The process of maintenance, rehabilitation, and failure is a very dynamic system. Therefore, it is essential that we take a life cycle approach to assessing the financial needs for the future. The level of detailed data available for analysis on each facility was limited and did not include date of construction/commissioning for the facility or its major components; therefore, it was not possible to complete a detailed life cycle assessment at this time. This data will be improved in future versions of the Asset Management Plan.

## 2.2 DETERIORATION OF TREATMENT FACILITIES

The components within a treatment facility operate in highly aggressive environments; therefore, deterioration can result from a number of complex factors, including the following:

- Chemical Attack
- Abrasion & Erosion
- Freeze-Thaw Cycles
- Corrosion of Metal Components

As with the other infrastructure assets covered by the “Building Together” initiative, regular inspections of the treatment facilities allow County staff to assess short- and medium-term failures of the various components.

In addition to structural failures resulting from deterioration of the assets, treatment facilities can also become functionally deficient as a result of growth within the communities that they serve, or as a result of regulatory changes that might require changes to the treatment processes. The County’s “Water & Wastewater Master Plan,”

<https://norfolk.civicweb.net/content/pdfstorage/AA43BD62E18C4463A7127DDDF0FC34F9-Water%20and%20Wasterwater%20Master%20Plan%20-%20Summ.pdf> which was completed in 2007, addresses these functional failures and provides recommended solutions.



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The Master Plan identifies Alternative 1, which is a new water treatment plant at Port Dover, with the associated transmission infrastructure feeding the remaining community systems. Given that the Environmental Assessment (EA) process has not been initiated, it is unlikely that the project will meet the 2019 start suggested in the County's 10-year capital budget. Therefore, the existing facilities will likely require improvement and/or upgrades in the interim.

## 2.3 INSPECTIONS

Regular inspections are completed jointly by County staff and consultants who assess short- and medium-term repair and rehabilitation needs. These projects are programmed and completed by the operations group. Larger more complex assignments such as upgrades are managed by the County's engineering group.



## 3.0 Desired Levels of Service

Levels of Service for water and wastewater treatment facilities are a combination of the Community's expectations and the County's required and desired maintenance and performance targets to meet legislative requirements.

It is important that the County first establish performance objectives for the Asset Management Program (AMP). Some typical examples of performance objectives are listed below.

- Produce high quality, safe, potable water
- Treat domestic and industrial effluent for discharge to receiving waters
- Reduce structural deterioration and operational problems due to poor maintenance
- Perform asset rehabilitation at the optimum point in the deterioration cycle
- Conduct benchmarking, both internally and with other similar communities

Performance objectives may be based upon legislative requirements, or industry best practices, and values/goals are agreed upon by the County and Community, through Council policies. Examples of current performance objectives associated with the delivery of the County's water and wastewater services can be found with the Public Works and Environmental Services 2013 Business Plan (<http://www.norfolkcounty.ca/download/government/county-departments/7%20-%20PWES%20Business%20Plan.pdf>). These include:

- Reduce response time by 25% for achieving resolution to water quality complaints.
  - Benchmark: 48 hours
- Reduce false positive adverse water quality results through promotion of staff awareness of proper sampling techniques and protocol by 20%.
  - Benchmark: 10 results

Within future iterations of this Asset Management Plan, the County will consider further refining its service level targets for water and wastewater services. Under consideration will be:

- A desired facility condition Index
- A maximum desired backlog of work
- A determination of funding and service goals for maintenance versus rehabilitation/replacement activities
- Seeking further Community input, to further refine expectations and targets



## 4.0 Asset Management Strategy

### 4.1 NON-INFRASTRUCTURE SOLUTIONS

Accurate and reasonable population growth forecasting allows the County to adequately plan the water and wastewater facilities expansion activities, and ensure that infrastructure is built only to meet reasonable demands.

On a project-by-project basis, Environmental Assessment studies will explore various options, including alternatives to building new infrastructure, for any major developments being considered in the County.

### 4.2 MAINTENANCE AND REHABILITATION ACTIVITIES

The various stages in an asset’s life cycle can be split into four distinct phases of activity. These activities are described below for the water and wastewater facilities.

**Table 4.1: Water and Wastewater Facilities Maintenance and Rehabilitation Activities**

Activity	Definition	Asset Age (overall facility)
<b>Minor Maintenance</b>	Planned activities such as monitoring, cleaning and lubricating, visual inspections, etc.	0-25% of asset life
<b>Major Maintenance</b>	Maintenance and repair activities are generally unplanned; however, they can be anticipated and would generally be accounted for with the County’s annual operating budget. These would include events such as repair of minor failures within components, pump maintenance, painting, replacing coatings, etc.	25-100% of asset life
<b>Rehabilitation</b>	Major activity required to upgrade or rehabilitate the asset, so that it can continue to provide service for an additional time period.	50-75% of asset life
<b>Replacement</b>	Some assets will reach the end of their structural and/or service useful life and require replacement. Experience in other communities has shown that the expected life of an asset will vary greatly, depending upon a number of environmental factors.	75-100% of asset life

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## 4.2.1 Typical Facility Maintenance and Rehabilitation Activities

- High Value Turbine Pumps – Inspection (vibration analysis/leaks) and maintenance every six months.
- Other Pumps – Routine maintenance or repair as required.
- Generators – Monthly inspections (temperature, oil leaks, etc.). Replace filters every two years. Routine maintenance or repair as required.
- Electrical (Substations/Transfer switches) – Routine maintenance or repair, as required.
- SCADA Systems – Upgrade systems as required.
- WWTP Membranes – New Microfiltration system. Replace every five years. Routine maintenance or repair as required.
- WWTP Clarifiers – Annual inspection (leaks). Repair concrete as required.
- Water Reservoirs/Towers – Drain, clean, and inspect every five years. Repair as required.
- Buildings – Routine Inspections (e.g. Thermal Testing). Routine maintenance, repair, or replace components (e.g. roof) as required.

## 4.3 DISPOSAL ACTIVITIES

The County is currently exploring three alternatives for the development of centralised water and wastewater treatment facilities, which would likely result in the de-commissioning of a number of the existing facilities. An assessment of these alternatives can be found within the “Water and Wastewater Master Plan”

(<https://norfolk.civicweb.net/content/pdfstorage/AA43BD62E18C4463A7127DDDF0FC34F9-Water%20and%20Wasterwater%20Master%20Plan%20-%20Summ.pdf>). A detailed assessment of the options for centralised water supply will be completed in 2014, through the development of an updated Master Plan.

Given that the EA process has not been initiated, it is unlikely that the project will meet the 2019 start suggested in the 10-year capital budget. Therefore, the existing facilities will likely require improvement and/or upgrades in the interim.

## 4.4 EXPANSION ACTIVITIES

Norfolk County expects low to modest growth in the foreseeable future. Expansion activities are reflected in the County’s exiting Master Plan, which will be updated in 2014. All major expansion projects are subject to Environmental Assessment studies, which evaluate the necessity of expansion of the asset portfolio and assess overall impact on the Community and the environment, for the various options available.

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The primary expansion activities projected for the water infrastructure will be building of a new water treatment plant and associated transmission mains which will draw water from Lake Erie to reduce the County’s reliance on groundwater sources. An updated Master Plan will be prepared in 2014, which will identify viable alternatives.

## 4.5 PROCUREMENT METHODS

To ensure the most efficient allocation of resources and funds, the County will consider:

- Bundling projects when issuing tenders, to realize cost-benefits of economy of scale

## 4.6 RISKS

The most significant risk facing the County with respect to the provision of water and wastewater services, to the Community, is the deterioration of water quality being drawn from the existing well systems which could result in many of these wells becoming unusable. The primary option available to mitigate this risk is the development of a centralised water treatment facility; three possible alternatives were identified within the 2007 Water and Wastewater Master Plan.

The selection of the most viable option should be completed within 2014 to allow the necessary approval and upgrades to existing facilities to be completed, with sufficient lead-time, before they are required to be fully operational.

Similar to other assets included within the “Building Together” initiative, there are several risks that could prevent the County from reaching/maintaining its target level of service for treatment facilities:

**Table 4.2: Risks Associated with Not Reaching Defined Level of Service Targets**

Potential Risk	Potential Impact
<b>Required Funding Not Secured</b>	<ul style="list-style-type: none"> <li>• Facility condition decreases</li> <li>• Facilities deteriorate beyond a condition where rehabilitation is a viable option</li> <li>• Backlog of work increases</li> <li>• More costly treatments are required</li> </ul>
<b>Substantial Increase in M&amp;R Unit Costs in Future</b>	<ul style="list-style-type: none"> <li>• Inability to complete all planned projects with allotted budget levels</li> <li>• Facility condition decreases</li> <li>• Facilities deteriorate beyond a condition where rehabilitation is a viable option</li> <li>• Backlog of work increases</li> <li>• More costly treatments are required</li> </ul>
<b>Environment Change (e.g., severe weather, high population growth)</b>	<ul style="list-style-type: none"> <li>• Increased infiltration and inflow resulting in treatment facility capacities being exceeded earlier than anticipated</li> <li>• Early upgrades required</li> <li>• Inadequate funding</li> <li>• More costly treatments are required to increase capacity or reduce inflow within the upstream collection network</li> </ul>

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## 4.7 ASSET MANAGEMENT PLAN FUTURE UPDATES

The Asset Management Plan for the water and wastewater treatment facilities is a living document, and will require regular review and refinement. Specifically, the County will:

- Review the Asset Management Plan annually, and confirm validity of assumptions and update costing
- Develop a Risk Based Critical Model for all water and wastewater facilities to assist in the prioritisation of rehabilitation and upgrade projects, specifically, ensuring redundancy in critical assets
- Update the Asset Management Plan every five years
- Commit to regular updates of treatment facility condition assessments
- Update all pertinent attribute and modeling data in the geo-database and asset management system
- Further refine its level of service targets by engaging in a Community outreach program, to help identify the desired levels of service of County's residents



# NORFOLK COUNTY – ASSET MANAGEMENT PLAN – WATER AND WASTEWATER TREATMENT FACILITIES

## 5.0 Financing Strategy

### 5.1 HISTORICAL INVESTMENTS

The County’s investment in road operations for the period 2011-2012 is summarized in Table 5.1, below. This data was derived from the Financial Information Return (FIR) filed with the Ministry of Municipal Affairs and Housing (<http://oraweb.mah.gov.on.ca/fir/welcome.htm>).

**Table 5.1: FIR Schedule of Operating Expenses (Schedule 40)**

Asset Type	Asset Component	2011 <sup>1</sup> (million)	2012 <sup>1</sup> (million)
<b>Environmental Services</b>	Water Treatment	\$3.471	\$2.980
	Wastewater Treatment & Disposal	\$4.271	\$3.689

<sup>1</sup>Excludes amortization expense & interest on long-term debt

### 5.2 TREATMENT FACILITY REVENUE REQUIREMENTS

The analysis, which was completed to identify Capital and Operating revenue requirements, was based upon the following assumptions:

1. All values are calculated in current dollars (2013).
2. Replacement costs were based upon the values identified within Table 2.4.
3. An allowance was made in the analysis, for Engineering (25%) and Contingencies (5%). No allowance was included for Utility Costs and Overhead and Admin.
4. Operating investments were estimated as 2.0% of the total replacement values of the sanitary system and excludes allowances for Overhead and Admin.

Therefore, based upon these assumptions the average annual revenue required to sustain the County’s treatment facilities is **\$6.1** million. Over this same period, and excluding growth, this represents 4.9% of the total treatment facility replacement value of **\$125** million.

Based on the high-level Sotl analysis results, and a review of the 2014 - 2023 capital funding needs (as supplied by County Staff) for the 10-year period, the budget for this period will meet the sustainable revenue requirements. The table below illustrates the finance requirements for the treatment facilities:

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**Table 5.2: Sustainable Revenue – Capital (millions)**

Facility	2014 - 2023 Projected Revenues (average annual)	Projected Sustainable Revenue <sup>1</sup> (average annual)	Overall Surplus/ (Deficit)
Water	\$1.9 <sup>2</sup>	\$2.9	(\$1.0)
Wastewater	\$3.4	\$1.4	\$2.0

<sup>1</sup>Assumes no growth in the County's population and infrastructure

<sup>2</sup>Excludes \$82.5 million budgeted for centralized water treatment plant from 2019-2023

## 5.3 BUDGET PROJECTIONS - CAPITAL

The County's proposed 2014-2023 capital budget shows that approximately \$101.5 million will be invested in the treatment facilities over this period. The projected capital investment and associated funding sources for the investment in the treatment facilities is summarized in Table 5.3.

**Table 5.3 : Budget Projections & Funding Sources 2014 – 2023 (Water Plants)**

		Year	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	Total
Budget (millions)			\$6.044	\$3.777	\$3.235	\$0.593	\$1,841	\$39.389	\$14.917	\$11.580	\$11.633	\$11.641	<b>\$101.474</b>
Funding Source	Debt												
	Debture Proceeds <sup>1</sup>		\$1.750	\$0.700	\$0.250	\$0.100	\$0.100	\$38.600	\$14.200	\$11.100	\$11.100	\$11.100	<b>\$89.000</b>
	Development Charge Debt												
	Gas Tax Revenue Reserve Fund		\$0.150	\$0.350	\$0.150	\$0.150	\$0.150		\$0.200				<b>\$1.150</b>
	Post DC Debt		\$2.959										<b>\$2.959</b>
	Water and Wastewater Rates		\$0.012										<b>\$0.012</b>
	Water Capital Replacement Reserve Fund		\$0.782	\$2.727	\$0.335	\$0.343	\$1.591	\$0.789	\$0.517	\$0.480	\$0.533	\$0.541	<b>\$8.638</b>
Water Development Charge Reserve Fund		\$0.391		\$2.500								<b>\$2.891</b>	

<sup>1</sup>Includes \$82.5 million budgeted for centralized water treatment plant from 2019-2023

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The proposed 10-year budget, detailed in Table 5.3, includes \$82.5 million of debt, which will be used to fund the development of the infrastructure necessary to transfer water from the Nanticoke Water Treatment plant. These loan agreements have not been executed; therefore, the actual funded 10-year budget for the water treatment facilities is approximately \$19.0 million.

**Table 5.4 : Budget Projections & Funding Sources 2014 – 2023 (Wastewater Plants)**

		Year	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	Total	
Budget (millions)			\$1.679	\$9.082	\$1.490	\$1.998	\$0.506	\$8.414	\$9.722	\$0.430	\$0.438	\$0.666	<b>\$34.425</b>	
Funding Source	Debenture Proceeds		\$0.580	\$0.300	\$1.100	\$0.100	\$0.100	\$0.100	\$0.100	\$0.100	\$0.100	\$0.320	<b>\$2.900</b>	
	Development Charge Debt													
	Federal Grants													
	Gas Tax Revenue Reserve Fund			\$6.480		\$1.250							<b>\$7.730</b>	
	Post DC Debt								\$5.786				<b>\$5.786</b>	
	Wastewater Capital Replacement Reserve Fund		\$1.025	\$0.922	\$0.390	\$0.648	\$0.406	\$0.314	\$1.622	\$0.330	\$0.338	\$0.346	<b>\$6.341</b>	
	Wastewater Development Charge Reserve Fund			\$1.320					\$8.000	\$2.214				<b>\$11.534</b>
	Wastewater Post Development Charge Reserve Fund													
	Water and Wastewater Rates		\$0.074	\$0.060										<b>\$0.134</b>